MARSHALL STAR
Marshall Space Flight Center
Jan. 18, 2001
'We bring people to space — We bring space to people'

Shuttle program to begin 2001 Science Odyssey for International Space Station with launch of Atlantis

The International Space Station will meet its "destiny" when Space Shuttle Atlantis launches.

Atlantis was scheduled to launch Friday, but Space Shuttle Program officials decided to return Atlantis to the Vehicle Assembly Building at Kennedy Space Center in Florida to conduct further inspections on the Solid Rocket Booster cables.

The launch will be delayed until no earlier than Feb. 6. Atlantis' launch delay also will have some impact on the scheduled March 1 launch of Discovery on the STS-102 mission to the Space Station.

Atlantis and its five-member crew will deliver the American-made Destiny module during the STS-98 mission. During the delay, Destiny will be removed from Atlantis' payload bay and remain in the payload change out room at Launch Pad 39-A.

Destiny is the first laboratory to be delivered to the orbiting platform and will mark the beginning of a 2001 space science odyssey for the space station and its Expedition One crew.

Destiny — built at the Marshall Center by the Boeing Co. — is an aluminum module 28 feet (8.5 meters) long and 14 feet

*See **Science Odyssey** on page 5*

NASA photo

STS-98 mission specialist Thomas Jones suits up during rehearsal for launch.

Not seeing is believing

Hubble, Chandra discover event horizon evidence

NASA's two Great Observatories, the Hubble Space Telescope and the Marshall-managed Chandra X-ray Observatory, have independently provided what could be the best direct evidence yet for the existence of an event horizon, the defining feature of a black hole and one of the most bizarre astrophysical concepts in nature.

An event horizon is the theorized "one-way ticket" boundary around a black hole from which nothing, not even light, can escape. No object except for a black hole can have an event horizon, so evidence for its existence offers resounding proof of black holes in space.

By using data from Chandra and previous X-ray satellites, a team of researchers studied a dozen "X-ray novae," systems that contain a Sun-like star that orbits either a black hole or neutron star. By comparing the energy output from X-ray novae in their inactive, or dormant, phase, the Chandra team determined the black hole candidates emitted only one percent as much energy as neutron stars.

"It's a bit odd to say we've discovered something by seeing almost nothing, but, in essence, this is what we have done" said Michael Garcia of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. "By detecting very little energy from these black hole candidates, we have new proof that event horizons exist."

If a collapsed star is a neutron star with a solid surface, energy must be released when infalling material strikes that surface. In contrast, if the accreting object is a black hole, only a small amount of energy can escape before it crosses the event horizon and vanishes forever.

"Seeing just this tiny amount of energy escape from the black hole sources is like sitting upstream watching water seemingly disappear over the edge," said Ramesh Narayan also of the Chandra team. "The most straightforward explanation for our observations is that these objects have event horizons and, therefore, are black holes."

Scientists using the Hubble Space

*See **Event Horizon** on page 4*

RLV program office seeking proposals to risks associated with developing next generation reusable launch system

by Marianne Higgins

NASA's Second Generation Reusable Launch Vehicle program office at Marshall is part of NASA's Space Launch Initiative and an integral part of the agency's Integrated Space Transportation Plan.

The office leads NASA's effort to enable development of a new reusable launch vehicle for flight in 2010 that will be dramatically safer and less expensive than today's rockets.

'We hope this program will give a boost to America's efforts to build a safer and more economical 'highway to space,' make the multi-billion-dollar commercial space industry a clear world leader and stimulate competition — all for the good of the economy, as well as our nation's future space exploration plans.'

Other elements of the plan include upgrades for safety of NASA's first generation RLV, the Space Shuttle and developing technologies for third- and fourth-generation transportation systems.

The office, charged with identifying requirements and developing technologies for the Second Generation RLV, is seeking proposals from industry and academia to reduce the business and technical risk associated with developing the next-generation reusable launch system. The proposals are a step toward enabling development of a launch system beginning in 2005, leading to an operational system that will dramatically increase safety and reduce the cost of space flight.

The second generation RLV program will build on NASA's current X-33, X-34 and X-37 programs — testing new materials, structures, propulsion, computers and other technologies needed to meet the program's goal of significantly increasing safety to a 1 in 10,000 chance of loss of life and reducing payload launch costs from $10,000 per pound today to $1,000 per pound.

"We hope this program will give a boost to America's efforts to build a safer and more economical 'highway to space,' make the multi-billion-dollar commercial space industry a clear world leader and stimulate competition — all for the good of the economy, as well as our nation's future space exploration plans," said Dan Dumbacher, manager of the Second Generation RLV Program Office.

Earlier this year, NASA solicited industry proposals and awarded contracts to define national mission needs and top level system requirements to meet safety and cost goals for a second generation RLV. They were the springboard for the five-year, $4.5 billion effort to reduce the risk associated with building and operating next-generation launch systems. The effort also is aimed at enabling more than one commercial option for private ownership and operation of reusable launch vehicles and opening additional market opportunities for getting cargo to the International Space Station.

NASA field center roles in the new program include: Marshall Center, program management, propulsion, cryogenic tanks; Langley Research Center, Hampton, Va., airframe development; Ames Research Center, Moffett Field, Calif., thermal protection systems, automated vehicle health monitoring; Kennedy Space Center, Fla., ground operations; Dryden Flight Research Center, Edwards, Calif., flight testing; Johnson Space Center, Houston, crew systems and flight operations support; Glenn Research Center, Cleveland, subsystems and propulsion support; and Stennis Space Center, Miss., engine systems testing. The U.S. Defense Department also will be involved in defining requirements and coordinating technical activities for the second generation RLV Program.

The writer, employed by ASRI, supports the Media Relations Department.

London named manager of Technology Evaluation Department

John R. London has been named manager of the Technology Evaluation Department in the Space Transportation Directorate.

London joined Marshall in 1997 as an aerospace engineer in the Space Transportation Programs Office, Advanced Space Transportation Program. He was subsequently appointed to the position of manager of the Pathfinder Program.

He came to Marshall from the U.S. Air Force where he held the rank of lieutenant colonel and was assigned to the Pentagon as program manager for the Space Based Laser Program. Prior to that, he also served as missile defense architect and congressional liaison officer for the Ballistic Missile Defense Organization at the Pentagon.

London

London holds a bachelor's degree in engineering technology from Clemson University in South Carolina and a master's degree in engineering management from the Florida Institute of Technology in Melbourne.

Photo by Dennis Olive, NASA/Marshall Space Flight Center

Five years, no lost time

Marshall Center Director Art Stephenson, left, presents Safety Awards to offices with five years and no lost-time accidents. Receiving awards, from left are Bill Hicks, Marshall's chief counsel; Axel Roth, Marshall associate director; Alex McCool, manager of the Space Shuttle Projects Office; and Willie Love, assistant director of the Equal Opportunity Office.

Chandra links pulsar to historic supernova

New evidence from the Marshall-managed Chandra X-ray Observatory suggests that a known pulsar is the present-day counterpart to a supernova that exploded in 386 AD, a stellar explosion witnessed by Chinese astronomers. If confirmed, this will be only the second known pulsar to be clearly associated with an historic event.

In roughly the past 2,000 years, less than 10 reports of probable supernovae have been archived, mostly by Asian astronomers. Until now, the Crab Nebula has been the only pulsar whose birth is associated with an historic event, the supernova of 1054 AD, making it the only neutron star with a firm age.

"Determining the true ages of astronomical objects is notoriously difficult," said Victoria Kaspi of the McGill University in Montreal, Canada, "and for this reason, historical records of supernova are of great importance."

Kaspi and Mallory Roberts, also of McGill University, presented these results last Thursday, at the American Astronomical Society meeting in San Diego, Calif. Also participating in the research were Gautum Vasisht from NASA's Jet Propulsion Laboratory in Pasadena, Calif.; Eric Gotthelf from Columbia University in New York City; Michael Pivovaroff from Thermawave Inc. of Fremont, Calif.; and Nobuyuki Kawai from the Institute of Physical and Chemical Research in Japan.

Scientists used Chandra to locate the pulsar exactly at the geometric center of the supernova remnant known as G11.2-0.3. This location provides very strong evidence that the pulsar, a neutron star spinning 14 times per second, was formed in the supernova of 386 AD, making it 1,615 years old.

Since pulsars move rapidly once they are formed, Chandra's ability to pinpoint the pulsar at the remnant's center implies the system must be very young. "We believe that the pulsar and the supernova remnant G11.2-0.3 are both likely to be left over from the explosion seen by the Chinese observers over 1,600 years ago," said Roberts. "While this is exciting by itself, it also raises new questions about what we know about pulsars, especially during their infancies."

These questions arose when the research team of the Japanese Advanced Satellite for Cosmology and Astrophysics (ASCA) applied the present spin rate to current models to determine the pulsar's estimated lifetime and compared it to the age of G11.2-0.3. The result was an age of roughly 24,000 years — far predating the birth year of 386 AD. To explain this contradiction, the Chandra team argues that this pulsar may have had approximately the same spin rate today as it did at its birth. If true, this could have important implications for conventional wisdom regarding pulsars, which may be spinning more slowly than previously thought.

Between mid-April and mid-May in the year 386 AD, the sudden appearance of a new star, presumably a supernova, was recorded by Chinese observers in the direction of the sky now known as the constellation of Sagittarius. In the 1970s, radio astronomers discovered an expanding nebula of gas and high-energy particles, called G11.2-0.3, believed to be the remnant of that explosion. In 1997, a team of X-ray astronomers used ASCA to discover a pulsar in the same area of the sky.

Safety tips

Safety checklist helps ensure your home is safe

Use the following checklist to identify safety hazards you may find in your home, and to assist in providing a safer home environment.

Additional safety checklists for office areas, outdoor storage areas, scaffolds, etc., are available on the Safety Home Page at: *http://msfcsma3.msfc.nasa.gov/checklists/checklists.html.*

Home Inspection Checklist

- Do you have a first aid kit for the home?
- Do you know cardio-pulmonary resuscitation?
- Is your house number easily visible from the street during all hours?
- Is lighting adequate in all traffic areas, including sidewalks, entrance areas, basements and stairways?
- Are traffic areas free of clutter?
- Are stairways clear, with no items stored on them, even temporarily?
- Are there sturdy railings on all stairways, even in the basement and outdoors?
- Are stairs, steps and floors in good condition and free of tripping hazards such as torn carpet and loose tiles?
- Is there a non-slip surface on the floor of the shower and bathtub?
- Is your home protected by these safety devices: smoke detectors, fire extinguishers, carbon monoxide detectors, and Ground Fault Circuit Interrupters on electrical outlets in the bathroom and basement?
- Is all wiring in good condition? Is wiring adequate for the electrical appliances used in the house, including computer equipment?
- Are extension cords used only temporarily? Are they kept out of traffic areas?
- Are chimneys for woodburning stoves and fireplaces cleaned yearly? Does each fireplace have a fire screen?
- Are any flammable liquids such as gasoline and paint thinner stored in approved covered containers, in well-ventilated areas? Are they kept far away from sources of ignition, such as cigarettes and pilot lights?
- Are drawers and cabinet doors closed immediately after use to prevent tripping accidents and head injuries?
- Are the handles of pots and pans always turned toward the center of the stove, not the edge of the stove where they can be reached by children or accidentally contacted by someone passing by?
- Are knives stored safely in a knife holder or other device so someone will not accidentally touch the blade?
- Are glass doors marked at eye level to prevent someone from accidentally walking into them?
- Is the house safe for children, even if they only visit occasionally? Are all medicines and cleaning materials stored well out of reach of children? Are stairways barricaded so youngsters cannot fall down them? Are electrical outlets covered by childproof plugs? Are matches and other flammable materials kept out of reach of children?
- Are emergency numbers posted at each telephone? Is the house address and telephone number posted there as well?
- Do you hold regular family fire drills? Does each member of the family know how to escape from his or her bedroom and where to meet outside?
- Are protective footwear and eye wear worn when mowing the lawn, operating power tools, working with a chisel and hammer or hammering metal on metal?
- Are appliances (such as heating pads and electric blankets) unplugged when not in use?
- Are guns kept in a locked cabinet and unloaded? Are firearms and ammunition stored separately?

Event Horizon

Continued from page 1

Telescope took an entirely different approach. Joseph F. Dolan, of NASA's Goddard Space Flight Center in Greenbelt, Md., observed pulses of ultraviolet light from clumps of hot gas fade and then disappear as they swirled around a massive, compact object called Cygnus XR-1.

Hubble, measuring fluctuations in ultraviolet light from gas trapped in orbit and around the black hole found two examples of a so-called "dying pulse train," the rapidly decaying, precisely sequential lashes of light from a hot blob of gas spiraling into the black hole. Without an event horizon, the blob of gas would have brightened as it crashed onto the surface of the accreting body. One event had six decaying pulses; the other had seven pulses. The results are consistent with what astronomers would expect to see if matter were really falling into a black hole, Dolan said.

Chandra researchers used the Advanced CCD Imaging Spectrometer for exposure times that vary roughly from 10,000 to 40,000 seconds per object. Hubble's high-speed photometer sampled light at the rate of 100,000 measurements per second, during three separate Hubble orbits, executed in June, July and August of 1992.

For more information, visit the Web at:
http://chandra.harvard.edu
and *http://chandra.nasa.gov*

Committee sponsors Black History Month competitions

The Marshall Black History Month Committee is sponsoring poster and essay contests and a science fair. The competitions are open to children of Marshall civil servants and contractors. Winners will be recognized for each competition.

The poster contest is for students in grades 3-5. A half-sized poster should relate to "Creating and Defining the African-American Community: Family, Church, Politics, Culture." Attach a cover sheet that includes the student's name, grade level, school, school system, teacher and topic. Posters must be received at the Huntsville-Madison County Public Library at 915 Monroe St. in Huntsville by Jan. 26.

Students in grades 6-9 may participate in the science fair. A three-panel display should highlight a project that falls within chemistry, physics/optics, engineering or biology. Call Johnnie Clark at 544-2799 to obtain an application and additional details. Applications are due by Feb. 1.

There will be an essay contest for students in grades 9-12. The essay must contain 200-250 words and address "Creating and Defining the African-American Community: Family, Church, Politics, Culture." Essays must be submitted to Johnnie Clark, ED34, no later than Jan. 26.

Photo by Terry Leibold, NASA/Marshall Space Flight Center

Special CFC Award

Center Director Art Stephenson, left, presents Roslin Hicks, of Marshall's Engineering Directorate, with a Special Service Award for her efforts as chairwoman of the 2000 Combined Federal Campaign.

Science Odyssey

Continued from page 1

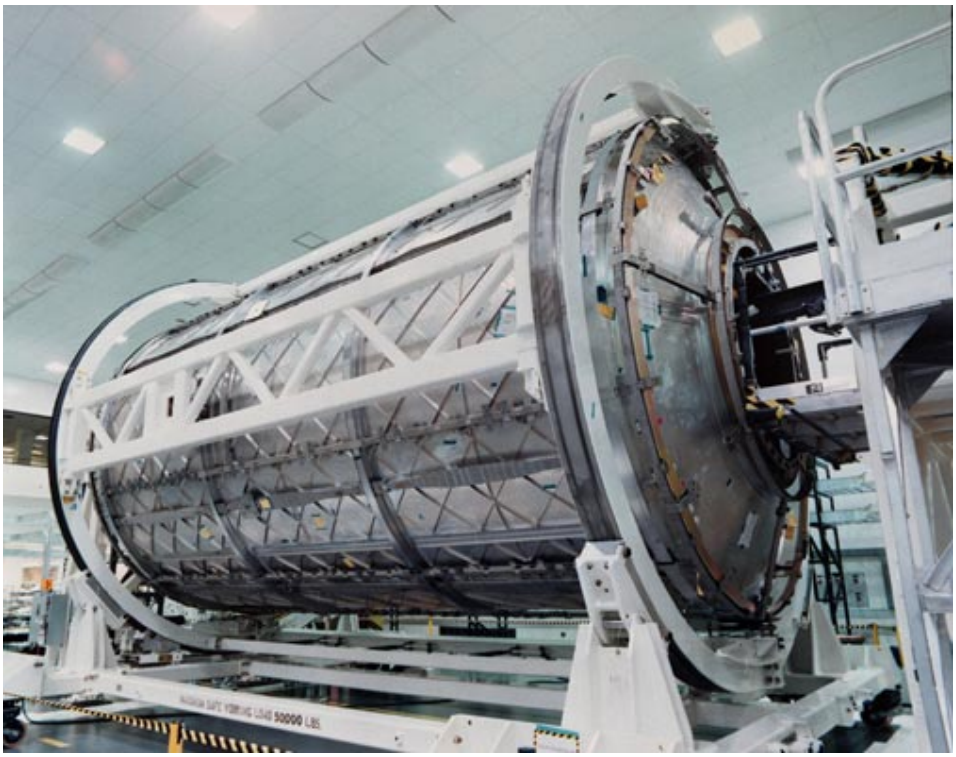
(4.3 meters) in diameter. The lab consists of three cylindrical sections and two endcones with hatches that will be mated to other Space Station components. A 20-inch- (50.9-centimenter-) diameter window is located on one side of the center module segment. This pressurized module is designed to accommodate pressurized payloads. It has a capacity of 24 rack locations. Payload racks will occupy 13 locations especially designed to support experiments.

"The Space Shuttle will see the 20th anniversary of its first launch this spring, and it's a fitting celebration that the year ahead holds some of the most challenging and spectacular tasks the Shuttle has ever been assigned," Space Shuttle Program Manager Ron Dittemore said.

The crew of Atlantis, Commander Ken Cockrell, pilot Mark Polansky and mission specialists Tom Jones, Marsha Ivins and Bob Curbeam, will use the Shuttle's robotic arm to attach the 15-ton Destiny lab to the station and reposition one of the docking ports.

Astronauts Jones and Curbeam will conduct three space walks to complete the new laboratory's connection.

This will be the second group of Shuttle astronauts to visit the Space Station and the Expedition One crew of American Commander Bill Shepherd and Russian cosmonauts, Sergei Krikalev and Yuri Gidzenko.



NASA photo

U.S. Lab Destiny

Expect to see new faces at Marshall Fitness Center

by Debra Valine

As you try to make good on those New Year's resolutions about getting in shape at the Marshall Fitness Center, you may be surprised by the new faces you'll encounter.

The NASA Exchange has a new manager and three new exercise specialists at the Fitness Center.

Bill Mayo, the Exchange's new manager, has been on board for about three months. He holds a bachelor's degree in general management from the University of Alabama at Tuscaloosa, brings 10 years' managerial experience to the job.

His plans include upgrading NASA Exchange capabilities. "One project I am working on is getting a replacement bank to move into the Bldg. 4200 location Regions Bank vacated about a month ago," Mayo said.

He said work continues at the Digney Road location which will be the eventual home of the fitness center. "Relocating the fitness center will give us some much-needed space to expand our capabilities,"

Mayo

Mayo said. "Then we may be able to open the center to contractors, as well as civil servants." He said there may be a fee for contractors.

Mayo also hopes to retain a physical therapist for the fitness center so employees who need therapy will not have to travel so far.

Mayo isn't the only new face at the fitness center. Charlie Gray, Tim Reynolds and Lana Hart recently joined the staff as exercise physiologists. Hart works full-time; Gray works part-time from 5-9 a.m.; and Reynolds works part-time from 4-7:30 p.m. Gray and Hart have bachelor's degrees in exercise science from Jacksonville State University in Jacksonville, Ala., Reynolds has three years' experience in the field of physical fitness and is a certified personal trainer.

The Fitness Center is open from 4:30 a.m.–7:30 p.m. Monday through Friday, and 7 a.m.-5 p.m. Saturdays. The center offers aerobics classes and weight-training programs, as well as basketball and racquetball. Licensed massage therapists are available by appointment. The Space Shop is open daily from 10 a.m.-5 p.m.

For more information, call the Fitness Center at 544-7565 or visit "Inside Marshall" on the Web.

The writer, employed by ASRI, is the Marshall Star editor.

Reynolds, standing, helps Barrt Roberts of the Engineering Directorate work out on a weight machine.

Photos by Dennis Olive, NASA/Marshall Space Flight Center

Marshall retiree Jesnett McCullar, left, gets help from Marshall Fitness Center exercise physiologists Gray, center, and Hart.

Center Announcements

All-hands meeting

Center Director Art Stephenson will hold an all-hands meeting from 8:30-10 a.m. Jan. 23 in the Bldg. 4610 cafeteria.

Leadership forum

A leadership forum at 1 p.m. Feb. 1 in Morris Auditorium kicks off Black History Month activities. Panelists will discuss "Creating and Defining the African-American Community: Family, Church, Politics, Culture."

Griner reception

A retirement reception honoring former Center Deputy Director Carolyn Griner will be at 6 p.m. Feb. 1 at the Huntsville Marriott. Tickets — at $5 each — are available from administrative officers.

Blood drive

The American Red Cross will hold a blood drive Friday in the NASA Exchange, Bldg. 4752. Those whose last names begin with A-B should donate at 8 a.m.; C-F, 8:30 a.m.; G-H, 9 a.m.; I-L, 9:30 a.m.; M-O, 10 a.m.; P-S, 10:30 a.m.; and T-Z, 11 a.m.

Clubs and Meetings

MARS Valentine Dinner Dance

Tickets for the Feb. 10 MARS Valentine dance are available from the MARS Ballroom Dance Club. The formal event will be held at the Von Braun Center East Hall and will feature ballroom music by the Little Big Band. Socializing will begin at 6:30 p.m. and a buffet dinner will be served at 7 p.m. followed by dancing from 8 to 11 p.m. Tickets are $25 per person with a $5 discount for members and are available through Feb. 5. They can be purchased from Linda Kinney at 544-0563, Tamara Landers at 544-6818, Pat Sage at 544-5427, Ed Ogozalek at 837-1486), Bob Williams at 544-3998, Hugo Berry at 544-3525, Woody Bombara at 650-0200, Joyce Davis at 880-2270, and Earl Herndon at 534-7408. Reservations for a table of eight can be made by calling Bombara.

Tango lessons

The MARS Ballroom Dance Club has scheduled tango lessons for Jan. 22 and 29 in the Parish Hall of St. Stephen's Episcopal Church at 8020 Whitesburg Dr. Intermediate classes will be taught from 7-8 p.m. and beginner classes from 8-9 p.m. at a cost of $6 per person per night. The instuctor is Bryon Fondren who is certified at both Arthur Murray and Fred Astaire dance studios. For more information, call Woody Bombara at 650-0200.

Shuttle Buddies

The Shuttle Buddies will meet for breakfast at 9 a.m. Jan. 29 at Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757 or Gail Wynn at 852-8189.

LabVIEW User's Group

LabVIEW User's Group will meet from 11:30 a.m.-1 p.m. Jan. 25 in Bldg. 4203, room 4002. Meeting. The topic of the meeting is "LabVIEW 6.0 Features - Application Examples." The meeting is free and open to all civil service and onsite contractor employees. To attend, RSVP before Jan. 24 to derek.mayer@msfc.nasa.gov.

Sports

Hockey game

The NASA Exchange is sponsoring The University of Huntsville Chargers vs. the U.S. Air Force Academy in a hockey game at 7 p.m. Jan. 20 at the Von Braun Arena. The 2,500 free tickets are available to the Marshall team from administrative officers, the Government and Community Relations Department, Bldg. 4200 room 828, or the NASA Exchange in Bldg. 4752.

Training

Spring semester schedule

Live seminars have been scheduled for the spring semester on Marshall's Continual Learning Channel 14. Topics include GPS, quality, the Internet, risk management, communications and others. As the time for each seminar nears, enrollment instructions will be announced through "Inside Marshall." To see a list of seminars scheduled, visit the Web at: *http://www.fedlearn.com/calendar/clientpages/nasa.htm*

Grounding, shielding techniques

A grounding and shielding techniques class for EMI, EMC and ESD will be held from 8 a.m.-4:30 p.m. Jan. 22-24 in Bldg. 4200, room G13-E. This course provides an intensive overview of basic principles, potential pitfalls and practical techniques, without the assumption of much prior knowledge of the topic. Civil servants may register via AdminSTAR. For more information, call Ela Washington at 544-1164.

Supplier diversity seminar

Socioeconomic Procurement as a Business Imperative" will be presented from 9 a.m.-3 p.m. Friday in Bldg. 4200, room G13-D. This teambuilding session is designed to create awareness and support for NASA's efforts to ensure the inclusion of Small Disadvantaged Business firms in every aspect of contracting and procurement. Civil servants may register to attend via AdminSTAR. For more information, call Lisa Greatouse at 544-0283.

Safety & Health makeup session

A Safety and Health training session is scheduled from 8 a.m.-4:30 p.m. Jan. 23. Civil servants interested in attending should send an e-mail to Pat Schultz.

Employee Ads

Miscellaneous

★ Men's Columbia banded waist ski jacket w/ removable fleece liner, large, red/black, worn twice, $100. 797-6173
★ NordicTrac WalkFit treadmill, $100; NordicTrac abworks, $50. 881-2435
★ Mahogany studio piano; exercise bicycle; stereo cabinet, 48"Hx36"Wx19"D, amplifier, records, turntable, 8" speakers. 883-0503
★ 1999 Kawasaki KX250, FMF pipe, 0-ring chain, new plastic, garage kept, $3,699. 772-2300
★ This-End-Up bedroom furniture, 19 pieces including 2 beds, trundle, dressers, shelves, $25-$200. 534-7981
★ Greatest Story Ever Told and Jesus VHS videos, $15. 722-9483
★ Lampshade, white nylon, 11" tall; diameter, top 14"; bottom, 19"; new, $25. 881-7953
★ Bose 901 stereo speakers; Nicolaus Amatus violin, bow and case; antique Queen Anne chairs. 837-7209
★ Lemon Bearded Dragon lizard, l yr. old, includes aquarium, lights, all accessories, $325. 922-9387
★ Heavy-duty bunk bed, red metal, $125. 881-0621
★ Solid walnut modern dining table, 62x40, 3-12" leaves, 6 chairs, 50"china cabinet. 341-0088
★ Washer/dryer, all parts replaced, located in Florence, AL, for UNA student, $175. 883-4334
★ Crocus, tulip and daffodil bulbs, new in bag, 100 and 50 count, $4 per bag. 325-6000
★ Oak computer desk w/drawers and shelves, $100. 859-8489
★ Limestone windowsills, 8 each. 882-1097
★ Pennsylvania House cherry dining table, Queen Anne, 2-leaves, 4-Empire chairs, table pad, $900. 882-1097
★ Kettler German-made folding rollaway aluminum and stainless tournament ping-pong table, $195; Barbell set w/weight bench, $50. 971-0571
★ Dictionary, Deluxe Webster's English language encyclopedia, new in pkg., $40; two afghans, large, colorful, best offer. 534-1275
★ Ruger 10/22 w/scope and 3 mags, $190; Taurus PT945 DAO .45ACP SS, $375. 851-8085
★ Large igloo dog house from Wal-mart, $50. 830-0854
★ Universal exercise machine, 400 lbs., $700. 859-2870

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Vehicles

★ 1999 Pontiac GrandAm SE, gray, 37K miles, automatic, 4-door, $11,500 obo. 880-6786/694-1951
★ 1977 Ford F100 pickup truck, $995. 880-7378
★ 1996 Blazer, 4-door, auto, 2/4WD, CD, leather, LT pkg., 77K miles, Maroon/silver, $10,500 obo. 880-9025
★ 1992 Dodge Grand Caravan, white, integrated child seats, power locks/doors, 104K miles, $4,900. 881-1559
★ 1994 Dodge Grand Caravan SE, sport pkg., one-owner, new Michelins, dual air, 103K miles, $6,150 obo. 837-5590
★ 1998 Honda Civic LX sedan, PW/PDL, automatic, cruise, new tires, silver, 46K miles, $12,700 obo. 230-6846
★ 1979 BMW 728 European model, new paint & interior, pertinent documents included, $5,000 negotiable. 881-8026
★ 1999 2000 Toyota Sienna XLE, black/ silver, 39K miles, towing package, oak leather seats, power moonroof/sliding door, $26,900. 828-2832
★ 1987 Mazda pickup truck, B-2200 SE-5, camper shell, bedliner, custom wheels, $2,300. 859-0729
★ 1986 Ford Bronco II, red/tan, 4WD, 211K miles, $1,800. 722-8570
★ 1997 Ford F-250 XLT pickup w/towing package, 4WD, 40K miles, auto, $16,250. 931-732-4742
★ 1991 Mazda Protégé DX, blue, a/c, 5-speed, high miles, $2,100. 851-2929

Found

★ Leather glove, Bldg. 4200. Call 544-4758 to identify/claim
★ Ladies earring, Bldg. 4200. Call 544-4758 to identify/claim
★ Floppy disks, printed circuit board and paperwork. Call 544-4758 to identify/claim

Area schools compete in Future City Competition

On Friday, students from across Alabama will compete in the Future City Competition — a competition designed to foster science, math and engineering to seventh- and eighth-grade students through hands-on, real world applications.

Twenty schools are in the semifinals to be held beginning at 8:30 a.m. in the Bldg. 4200 lobby. Employees are encouraged to come take a look.

The Marshall Center will present awards to the top five teams. Local technical organizations and companies will present the following special awards:

• American Society of Chemical Engineers (AICHE) — "Best Water Reuse/Recycle System"

• Alabama Society of Professional Engineers (ASPE) — "Best Overall Innovation"

• American Society for Quality (ASQ) — "Best City Services"

• Institute of Electrical and Electronics Engineers (IEEE) — "Best Telecommunications and Power Systems"

• Instrumentation, Systems, and Automation Society (ISA) — "Student's Choice Award"

• Society of Manufacturing Engineers (SME) — "Cleanest Manufacturing Plants"

• Sverdrup Technology Inc. — Marshall Group — "Best Aesthetic Design in Structural Engineering"

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